UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,071	03/26/2004	Simon Fenney	R & G C-373	8073

			EXAMINER
23474	7590	12/28/2005	HAJNIK, DANIEL F

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ART UNIT	PAPER NUMBER
2671	

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<table>
<tr>
<td rowspan="3">Office Action Summary</td>
<td>Application No.</td>
<td>Applicant(s)</td>
</tr>
<tr>
<td>10/811,071</td>
<td>FENNEY ET AL.</td>
</tr>
<tr>
<td>Examiner</td>
<td>Art Unit</td>
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<td></td>
<td>Daniel F. Hajnik</td>
<td>2671</td>
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</table>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>26 March 2004</u>.

2a)☐ This action is **FINAL**.　　　2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-18</u> is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-18</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☒ None of:

　　　1.☒ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Priority

1.   Acknowledgment is made of applicant's claim for foreign priority based on an

application filed in the United Kingdom on 3/27/2003. It is noted, however, that

applicant has not filed a certified copy of application United Kingdom 0307095.0 as

required by 35 U.S.C. 119(b).

Claim Objections

2.   Claims 10 and 15 are objected to because of the following informalities: Please

change "characterised" to "characterized". Appropriate correction is required.

Claim Rejections - 35 USC § 103

3.   Claims 6-8 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Greene et al. (US Patent 6646639, herein referred to as "Greene").

As per claims 6 and 15, Greene teaches the claimed "subdividing ... into ...

rectangular areas" by teaching of in figure 2 where the display 200 is divided into tiles

206 (rectangular areas).

Greene teaches the claimed "testing edge information" by teaching of "Step 1310

performs this test on each edge of the polygon (or until it is determined that the sample

lies outside at least one edge" (col 23, lines 46-48).

Greene teaches the claimed "inserting the object ... in dependence on the result

of the determination" by teaching of in figure 13, step 1318 "Set status to visible" and in

figure 8, step 806 "Report polygon list visible" where the process of marking a polygon
as visible is similar in functionality to inserting it into a list of polygons to be displayed for
a given tile.

Greene teaches the claimed "shifting the edge information by a predetermined
amount in dependence on the orientation" by teaching of "the equations can be
evaluated efficiently with shifts" (col 26, lines 6-7) and "looping over cells within a tile ...
can be computed incrementally" (col 26, lines 3-4) (a predetermined amount). The
orientation is taken into consideration in figure 9, step 902 where the polygons that the
equations are based upon are transformed to perspective space.

Greene does not explicitly teach the claimed "deriving a list of objects ... which
may be visible in that rectangular area". However, Greene teaches of in figure 3, piece
304 a 'Tile Polygon List' which keeps track of visible faces of objects associated with
each tile (area). Further, Greene teaches of "objects are passed from an input stream to
a geometric processor for being transformed" (col 6, lines 1-3) and teaches of "Tile
polygon List 800 processes polygons one by one until all polygons on the list have been
tiled" (col 31, lines 55-56). Lastly, Greene teaches in figure 7, the step 708 - "Determine
if any front face is visible with 'Tile Polygon List'".

Given these teachings, it would have been obvious to one of ordinary skill in the
art to use the claimed limitation because an "object list" would contain the similar
information as the disclosed "tile polygon list" and thus the "object list" could be simply
used to save memory by linking the object directly to the tile rather than linking it to one
or more faces of the object.

As per claims 7 and 16, Greene teaches the claimed "shifting by either the vertical or horizontal dimension" by teaching of "the values of x and y in the equations are small integers, which permits the equations to be evaluated with shifts" (col 25, line 66) to (col 26, line 1).

As per claims 8 and 17, Greene teaches the claimed "shifting step is performed using a floating point calculation" by teaching of "Shifting can be used to scale numbers represented in floating-point format" (col 28, lines 33-34).

4.   Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greene in view of Xavier (US Patent 6099573, herein referred to as "Xavier").

As per claims 9 and 18, Greene does not explicitly teach the claimed "shifting means uses a safety margin ... if the edge information falls close to a sampling point". Xavier teaches the claimed limitation by teaching of "Usually, either interference or distance computation queries are applied at closely spaced points on the path. Simple use of interference detection can miss collisions. Growing the objects by a safety margin can prevent this" (col 1, lines 49-57).

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Greene and Xavier. One advantage to the combination is provided by Xavier, which teaches of "Exact or accurate collision detection is often avoided for the sake of speed" (col 1, lines 49-50) where collision detection requires an edge detection test. Greene suggests the need for such a safety margin by teaching of "

multiple-pass rendering using conservative occlusion culling" (col 5, line 67 to col 6, line 1).

5.   Claims 1-5 and 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greene in view of Koneru et al. (US Pub 2003/0122819, herein referred to as "Koneru").

As per claims 1 and 10, the reasons and rationale for the rejection of claim 6 are incorporated herein (in regards to the "subdividing" and "deriving a list of objects" limitations).

Greene teaches the claimed "determine how the rectangular area should be shaded" by teaching of "shading operations may be performed" (col 6, lines 10-12).

Greene teaches the claimed "determining a set of sampling points" by teaching of in figures 14 and 15 of sampling based upon the vertices of an object that overlaps a given tile where the vertices are based upon maximum and minimum calculations.

Greene teaches the claimed "determining whether or not a bounding box surrounding the object covers any of the sampling points" by showing in figure 4, bounding boxes labeled 'A' to 'F" around objects and by teaching of in figure 6, step 610 - "Box intersects near frustum face?" where such a step is used to determine which bounding boxes will intersect with sample points associated with the view frustum.

Greene teaches the claimed "adding or rejecting the object from the list in dependence of the determination" by teaching of in figure 6, piece 612 - "Add box to near-box list" and step 616 - "Add box to list of layer L".

Greene does not explicitly teach the claimed "determining maximum and minimum values". Koneru teaches the claimed limitation in figure 7, where the maximum and minimum values are labeled 'bb x min', 'bb y min', and 'bb x max', and 'bb y max'.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Greene and Koneru. One advantage to the combination is provided by Greene, which teaches of "First, step 902 transforms the polygon's vertices to perspective space. Next, step 904 determines the smallest NxN tile in the pyramid that encloses the transformed polygon" (col 17, lines 33-35) which suggests the need for finding these minimum and maximum values associated with the polygons vertices.

As per claims 2 and 11, Greene teaches the claimed "determining whether or not the separation of the sampling points exceeds the resolution of the display... adding or rejection ... in dependence" by teaching of "oversampling with a 4x4 array of depth samples within each pixel" (col 12, lines 15-16) where such an oversampling operation would require the ability to determine when the sampling points exceed the resolution of the display and where such oversampling is used for occlusion culling (col 12, lines 20-22).

As per claims 3 and 12, Greene teaches the claimed "the resolution of the display comprises the pixel separation of the display" by teaching of higher resolutions having more pixels (col 12, lines 14-19) where using more pixels would effect the separation between them.

As per claims 4 and 13, Greene teaches the claimed "testing each sampling point against each edge of the object ... adding or rejection ... in dependence" by teaching of

"Step 1310 performs this test on each edge of the polygon (or until it is determined that the sample lies outside at least one edge" (col 23, lines 46-48) and in figure 13, step 1318 "Set status to visible" and in figure 8, step 806 "Report polygon list visible".

As per claims 5 and 14, Greene teaches the claimed "selecting only those rectangular areas which fall at least partially within the bounding box" by teaching of in figure 5, step 506 - "For each box on near-box list, render polygon list with 'Render Polygon List' where only areas are rendered that fall within the bounding box (box) (also see figure 10 where areas to be rendered appear as shaded).

Conclusion

6.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Please see form 892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel F. Hajnik whose telephone number is (571) 272-7642. The examiner can normally be reached on Mon-Fri (8:30A-5:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka J. Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

   Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

12/19/2005

DFH

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER